DOCUMENT RESUME

ED 323 975 IR 014 620

AUTHOR Stiles, J. Mark
TITLE Communications and Information Technologies and the Education of Canada's Native Peoples. New Technologies in Canadian Education Series. Paper 6.
INSTITUTION TV Ontario, Toronto.
PUB DATE Jun 84
NOTE 59p.; TVOntario: Office of Development Research. For other papers in this series, see IR 014 615-631.
PUB TYPE Information Analyses (070) -- Reports - Descriptive (141)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS Adult Education; *American Indian Education; *Canada Natives; *Communications Satellites; *Computer Assisted Instruction; *Educational Television; Elementary Secondary Education; Foreign Countries; Government Role; Instructional Films; Material Development; *Microcomputers; Nonformal Education; Teleconferencing; Videotex
IDENTIFIERS *Canada

ABSTRACT

This paper examines communications and information technologies and the ways in which they have been used in both the formal and the nonformal education of Canada's native people (four groups: status Indians, non-status Indians, Metis, and Inuits). It is noted that generalizations about the use of technology in native schools is difficult because of the varying official status of native populations, different provincial jurisdiction over those populations, and the different languages and customs involved. The first section of the paper considers the use of film, video, and computers in formal education settings. The second section briefly discusses the history of native education from 1960 to 1983 and examines federal experiments in nonformal educational applications including radio, satellite, video, and interactive television communications. A mini-revolution in the development of native-language materials made possible by new developments in microcomputer technology is described, as well as uses of computers, instructional television, teleconferencing, and instructional video in classroom settings. A concluding statement briefly discusses the need for native access and control, the need to exploit the interactive capacity of new technologies, the need for culturally appropriate software, the need for further research, and future goals for the education of Canada's native peoples. It is noted that, although educational technologies offer native Canadians the potential for major advancements in formal and nonformal education, there is always the danger that the distinct identity of native peoples may be subverted in the process. (44 references) (DB)

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NEW TECHNOLOGIES IN CANADIAN EDUCATION

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PAPER 6

COMMUNICATIONS AND INFORMATION TECHNOLOGIES AND THE EDUCATION OF CANADA'S NATIVE PEOPLES

By J. Mark Stiles

Study Coordinator
Ignacy Waniewicz

June 1984

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Paper 2	Communications and information technologies in Canadian elementary and secondary schools
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Paper 6	Communications and information technologies and the education of Canada's native peoples
Paper 7	The provincial educational communications organizations in Canada
Paper 8	Educative activities of the Canadian Broadcasting Corporation and the National Film Board of Canada
Paper 9	Applications of new technologies in nonformal adult education in Canada: Two examples
Paper 10	Canadian cable television and education
Paper 11	Educational applications of videotex/Telidon in Canada
Paper 12	Educational applications of communications satellites in Canada
Paper 13	Educational videodisc in Canada
Paper 14	Educational teleconferencing in Canada
Paper 15	Telehealth: Telecommunications technology in health care and health education in Canada
Paper 16	The high technology industry and education in Canada
Paper 17	New technologies in education in Canada: Issues and concerns

Copies of these papers can be purchased from TVOntario, Box 200, Station Q, Toronto, Ontario, Canada M4T 2T1.

FOREWORD

We dedicate this series to its designer and director, Ignacy Waniewicz. His death on February 21, 1984, has left us with a feeling of immeasurable loss.

With uncanny intelligence, instinct, and energy, Ignacy introduced the first educational television programs in his native Poland in 1957 and rose to the position of Director of Educational Broadcasting. During the mid-1960s, he served as a Paris-based program specialist in the educational use of radio and television, working for UNESCO in Chile, Cuba, Ivory Coast, Upper Volta, Mexico, Egypt, Nigeria, Senegal, Ghana, Great Britain, United States, Switzerland, and Israel. Ignacy shared the experience and insight he gained from this work by teaching and writing in Polish, German, Russian, Hebrew, Spanish, French, and English. His achievements are widely recognized in the broadcasting and academic communities on four continents.

As Director of the Office of Development Research at TVOntario, Ignacy explored his farsighted and consuming interests in adult education, media literacy, television as a primary tool for lifelong learning, and most recently, the educational uses of new technologies. His work did much to shape and guide TVOntario's progress over the last 15 years.

It is with love and respect that we dedicate this series to Ignacy Waniewicz. In its enormous scope, its thorough documentation, its emphasis on concrete results, and its concern with educational issues, this series reflects both Ignacy's vision and his intellectual legacy.

Donna Sharon
for the Office of Development Research

Preface to the Series

NEW TECHNOLOGIES IN CANADIAN EDUCATION

These papers in the series "New Technologies in Canadian Education" are the result of an international commitment. In June 1980, the Third Conference of Ministers of Education of Member States of the European Region of UNESCO adopted a recommendation requesting the member states to carry out joint comparative studies on well-defined problems of common interest in education. At a subsequent meeting of the European Region National Commissions for UNESCO, 14 subjects were agreed on for joint studies.

The theme "New Technologies in Education" was selected as study #11. The 17 countries participating in the study are Austria, Belgium, Denmark, Finland, France, Hungary, Italy, the Netherlands, Poland, Spain, Sweden, Ukrainian SSR, USSR, United Kingdom, as well as Canada, Israel, and the U.S.A. who are also members of the UNESCO European Region. At the first meeting of the national coordinators from these countries, held in October , 1982, at the University of South Carolina in Columbia, South Carolina, U.S.A., a plan was adopted for the study. In the first phase of this plan, the individual countries are to report on the ways in which the new technologies are being used in education. (A brief outline of the international design is available on request.)

The Canadian Commission for UNESCO was requested to coordinate, on an international level, the first year of the study. We are grateful to the Canadian Commission for selecting TVOntario, and the Office of Development Research (ODR) to be in charge of this task. The ODR was also asked to coordinate the Canadian contribution to the study, with financial support from the Department of the Secretary of State. We gratefully acknowledge their assistance.

In preparing the Canadian review of the use of technology in education, the ODR contacted a number of educators, academics, government officials, administrators in educational communications organizations, and others, across the country. It became apparent that there was a strong need for a well-documented account of the uses of both the "older" technologies (e.g., film, audio, television) and the newer technologies (e.g., computers, videodiscs, videotex) in the complex Canadian educational system.

Early in 1983, several types of research activities began simultaneously: designing instruments to gather information from each type of institution or interest group, identifying uses and users of each type of technology, and exploring the areas where Canada's distinctive features predispose toward technological developments. The 17 papers listed on the back of the title page emerged as a result.

Information for these papers was provided by hundreds of individuals expressing their own views or reporting on behalf of educational institutions and organizations, government departments, public and private corporations. We extend to them our sincere thanks.

I would like to acknowledge the contribution made by Thelma Rosen who assisted in the development of the inquiry instruments and played a major role in the gathering of this information. The task of supervising the final editing, production, and distribution of the papers was assigned to Donna Sharon. Her resourcefulness and persistence have contributed greatly to the completion of this series. Sharon Parker typed most of the papers from the initial drafts to their final versions. Her dedication made it possible to complete the study in such a relatively short period.

While the preparation of these papers has been supported by the Canadian Commission for UNESCO and the Department of the Secretary of State, the papers' contents do not necessarily reflect the official views of either party on issues related to technology in education.

Ignacy Waniewicz
Study Coordinator
Director
Office of Development Research
TVOntario

January 1984

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INTRODUCTION

This paper is concerned with the formal and nonformal education of Canada's native people who number well over one million.[1] It examines communications and information technologies and the ways in which they have been used by native people, predominantly those in the northern regions of Canada, for educational purposes.

Most research on native education leads to disheartening conclusions. The failure of the formal educational system in Canada to equip young native people with the knowledge and skills they require has been well documented.[2] Because this paper is essentially a descriptive account of some of the more successful projects and experiments, it may appear unconventionally optimistic.

This paper traces the history of native involvement with the new technology and looks at trends for the future. More attention is given to the use of the technologies in nonformal education than in the formal educational system where developments in the use of technology have been slower.

For the purposes of this paper, "formal education" refers to a structured, chronological educational system, running from primary school through to university and including technical and professional training.[3] Nonformal education is any organized activity outside the established framework of the formal school and university system, that aims to communicate specific ideas, knowledge, skills, attitudes, and practices in response to a predetermined need.[4]

COMMUNICATIONS AND INFORMATION TECHNOLOGIES IN NATIVE SCHOOLS

Overview of formal native education

Native people in Canada are divided into four groups - status Indians, non-status Indians, Métis, and Inuit. Status Indians, who number about 317,000 and who are members of the 575 registered Indian bands in Canada,[5] are legally entitled to the benefits of programs under the Indian Act,[6] benefits which include federally sponsored education. Although Inuit are not recognized under the Indian Act, the Supreme Court of Canada ruled in 1939 that they have the same relationship to the federal government as status Indians. Inuit, who number approximately 24,000, live mainly in the Arctic coastal regions of Canada, in the Northwest Territories, and in the northern regions of Quebec and Labrador.[7] Together with status Indians, they make up about 1.3 per cent of the total Canadian population.

Non-status Indians, who number over 500,000, include those who claim to be of native ancestry but who are not legally recognized under the terms of the Indian Act. The Métis, people of mixed white (usually French) and Indian ancestry, fall under the same legislative and policy grouping as non-status Indians. Their education is under provincial jurisdiction.

The federal Department of Indian Affairs and Northern Development (DIAND) is responsible for the provision of numerous services, including education, to status Indian and Inuit children through federally operated schools, band-operated institutions, or schools under provincial or territorial jurisdiction. Federal schools serve 28 per cent of all Indian and Inuit students. As of June, 1983, there was a total of 170 federal schools throughout Canada. Newfoundland is the only province without federal schools, as native education is under provincial jurisdiction.[8]

About 16 per cent of the Inuit and Indian student population is now under the direction of native organizations with varying degrees of administrative control over education.[9] As yet, only a few native school boards have the same degree of power and authority as provincial school

boards. They are the Cree School and the Kativik School Board (Inuit) in Quebec and the Nishga School District No. 92 in British Columbia. Federal policy encourages local control of education, and DIAND provides funding through contribution agreements with the local band or school board.

The majority of Indian and Inuit students (54 per cent) attend elementary and secondary schools under provincial or territorial jurisdiction.[10] (Paper 2 in this series describes the use of technology in the provincial educational systems.) Depending on the province and the region, DIAND assistance varies from payment of tuition fees and provision of transportation services to the full maintenance of students in boarding homes or student residents. At the postsecondary level, DIAND has an education assistance program for Indian and Inuit students that covers tuition costs and some training and living expenses. In the 1980-81 academic year, approximately 4,800 native students received this form of assistance.[11]

The shift toward greater native administrative control of education, following the adoption by the federal government of the goals set out in the National Indian Brotherhood's policy paper,[12] has helped make formal education a more relevant and practical experience for native students.[13] However, the number of native students who complete their secondary education remains less than one-quarter the national average; Indian unemployment rates are more than double provincial and territorial rates; and social and health conditions fall well below national standards.[14]

Technologies in the native classroom

It is difficult to generalize about the use of communications and information technogies in native schools. There are three types of school administration - band-operated schools, federal schools, and provincial schools - and consequently there is a great deal of variation from one region to the next, depending on the availability of resources and the priority attached to the use of various technologies.

From the available information, however, one can surmise that federally controlled and band-operated Indian schools have been somewhat slower to introduce new technology into

the classroom than many provincial schools. In general, provincial schools have better facilities[15] and, especially, in the richer provinces they have access to more substantial financial resources than most federal or band schools. According to a recent report by the Canadian Education Association, DIAND contributes more money per student to provincial school boards than it does to federal or band-operated school authorities.[16]

Film use. Film is widely used for instructional purposes. Sixteen-millimetre projectors are available for use in almost every school attended by native students in each province and both territories. It is estimated, for example, that approximately 70 per cent of the teachers of Indian children in Ontario use film on a regular basis,[17] and that 60 per cent of the teachers in the Northwest Territories (NWT) use film regularly.[18]

In native schools, film is often used to illustrate or expand on science and social studies curricula. It also serves to reinforce English- or French-language instruction where the student's first language is a native dialect. Films are often used to illustrate various aspects of native cultural heritage, such as legends, traditional ceremonies, and hunting and trapping activities. The role of native men and women in today's society is also examined through film. Increasingly, native studies form an integral part of the curriculum in many schools. Educators recognize that this area of study can strengthen native identity and increase the sensitivity and understanding of non-native students in an intercultural environment. Ironically, native studies teachers are faced with the challenge of using film to counter the negative stereotyping of Indians and Inuit in films and other media.

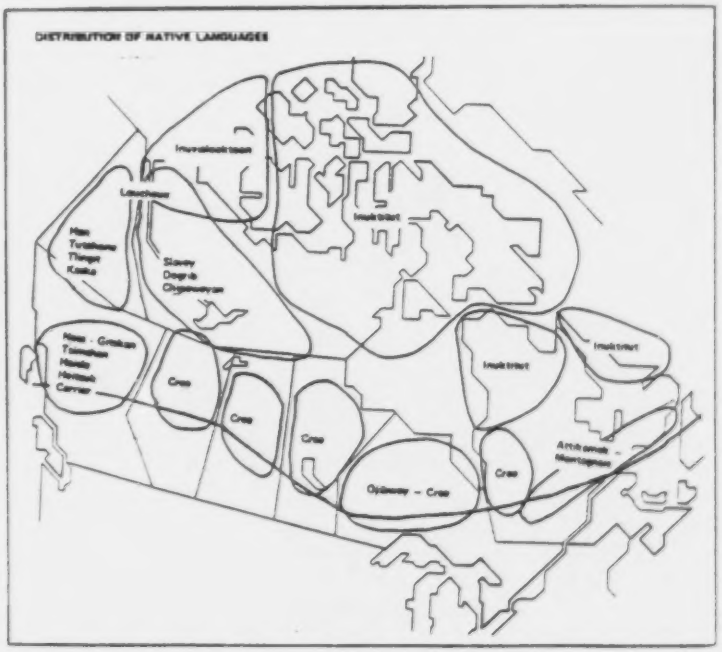
Hundreds of films exist for native studies - one DIAND catalogue[19] lists over 800 - but getting access to them is often problematic, especially for the more isolated Indian schools in the northern sections of many provinces. Most provincial school boards have the resources to purchase large numbers of films and are equipped with established media centres. In the Northwest Territories, there are five such centres, one for each administrative region. Depending on the agreement worked out between DIAND and each province, federal and band-operated schools might not have access to

provincial media centres. Because DIAND does not coordinate educational media support, federal and band schools often rely on borrowing films from agencies such as the National Film Board of Canada (NFB).

The NFB is the single largest Canadian source of films on native people. The films are available free of charge to all Canadians. The NFB catalogue includes more than 100 films on Indians and Inuit, representing nearly seven per cent of all English titles and five per cent of all French titles available. Of these, about two dozen were made with input from native filmmakers.

Despite the existence of a wide variety of films about native people, there is a lack of material available in native dialects. Because the use of native languages in general is slowly declining, the need for such film resources is becoming increasingly important, particularly in northern Canada where at least 17 aboriginal dialects are in active use and where most schools emphasize native-language instruction.

FIGURE 1



Source: Department of Communications. Northern Broadcasting. Discussion paper. Ottawa: Department of Communications, February 1983, p. 45.

Multimedia learning resources. A variety of multimedia packages are available to teachers of native students. These packages may include audiotapes, slide sets, filmstrips, posters and maps. The materials are often produced under the direction of provincial education authorities or by curriculum specialists, who then market them through commercial educational media distributors. The National Film Board has taken an active role in the development of multimedia kits for use in native classrooms. In the late 1970s, the NFB sent some of its education specialists to Indian reserves to experiment with media in the classroom and to encourage the active involvement of native children in the creation of their own learning resources. One NFB educator describes some of the ways to stimulate active learning in a native classroom environment using relatively inexpensive technology such as Polaroid cameras, 35mm filmstrips, and tape recorders:

> It's very easy to use a simple tape recorder to record an elder's story or someone's drumming or chanting. This tape can then serve as a sound track for a simple filmstrip made by illustrating on 35mm clear leader one of the favourite stories or legends. Or, using photographs and slides, one can consider different forms of transportation on the reserve, occupations, family life, the proper way to cut up the carcass of a deer and so on. The photographs can then be arranged into books with commentary written in the appropriate language...By allowing the child to collect, manipulate and extend images of himself and his surroundings, media can help to reinforce the child's sense of himself as an active being.[20]

Video technology. Video technology has now become commonplace in most native schools. Because video offers greater classroom flexibility, it is used more extensively than film in some schools. Most schools in the Northwest Territories now have color video monitors and recorders;[21] all 108 federal and band-operated schools in British Columbia are equipped with video recorders;[22] and of the 18 federal Indian schools in Manitoba, 16 have three-quarter-inch recorders and 11 have compatible color cameras.[23]

DIAND provides training workshops for teachers and community leaders in an effort to increase the awareness of the potential of the media and to develop a core of skilled personnel who can apply the technology in creative ways. The introduction of the technology and the accompanying training programs have led a few native schools to establish their own community transmitters. One such transmitter established in a band-operated school in Saskatchewan reaches the homes in two adjacent reserves served by the school. School authorities produce local programming, which they supplement with commercial videotapes for broadcast. Since many homes have no telephone, the school's television station serves as a valuable communications link between the school and the home. The station also serves as a training facility that gives students hands-on experience with the essentials of television production and transmission.

On the whole, however, examples of such innovation are rare. Satellite television receivers are now found in the remotest Indian reserves and Inuit villages. Native languages and culture are gravely threatened, and the need for alternative, more culturally appropriate programming is acute. The destructive effects of television viewing on native social and cultural life have been well documented,[24] and suggest that native curriculum developers must turn their attention to the development of programs in media awareness and media literacy.

The increased variety of media resources now found in most schools does not necessarily reflect the extent to which the technology is put to good use. The isolation of many northern Indian reserves may hinder the effective use of media technology in the classroom. For example, some northern schools may wait months for equipment to be repaired, only to have it damaged again in return transit. Fluctuating fuel-generated power in some native communities has been known to damage film and video equipment or limit their effectiveness. Most significantly, the technology is dependent on the skills and enthusiasm of the teachers. DIAND officials in Saskatchewan assess the quality and scope of educational media facilities and materials available to teachers as good to excellent, while the utilization of these services is assessed as only fair to good.[25] To use the technology effectively takes considerable preparation and skill. In some areas, teachers, parents, and school administrators still view film, multimedia resources, and

video equipment as expensive toys and remain unconvinced of their potential as aids to creative learning.

Microcomputers and new technologies. Microcomputers are being introduced in federal and band-operated schools, although, in some regions, not as quickly as they are in provincial schools. For example, in 1983 there were only four experimental microcomputer pilot projects among the 28 federal and band-operated schools in Alberta[26] and there were none among the 49 federal and band-operated schools in Manitoba.[27] In contrast, by June, 1983, there were approximately 3,500 microcomputers in the provincial schools of Alberta and about 1,600 in Manitoba schools.[28] DIAND officials anticipate that 75 per cent of the federal and band-operated schools in Ontario will have microcomputers and trained instructors by June, 1984.[29] Eighty per cent of the schools in the Yukon will have microcomputers by 1985, and DIAND predicts that microcomputers will be introduced into Indian schools in the Atlantic province at about the same rate as in provincial schools.[30]

The statistics can be misleading. Microcomputers in some schools are used exclusively by school administrators for keeping track of student records and equipment inventory. DIAND officials report, however, that most microcomputers are used for mathematics and science instruction and to reinforce English and French language usage and problem-solving skills. In general, the senior grades are the first to have access to this new technology. Owing to the relatively high capital investment required, it is not uncommon in some Indian schools for several hundred students to share one microcomputer.

One of the factors limiting the use of computer technology in native classrooms is the lack of relevant, culturally appropriate software. With a few exceptions (such as in the Northwest Territories, where work is being done on creating software in Slavey and Inuktitut), most of the software is in English and is geared to an urban, non-native student population. For Indian schools where indigenous language retention is not a major issue, this does not seem to pose a problem. For others, especially in the North, it is a matter of deep concern. DIAND's Regional Director for Education in Ontario concludes: "In an era in which cultural maintenance is a primary concern of Indian people, the use of

technology for which little if any culturally sensitive courseware is available would seem counter-productive."[31]

A problem connected with the demand for appropriate courseware is the need for compatible microcomputer technology. With ten provinces, two territories, the federal government, and about 190 band-operated education authorities across the country, it is not surprising to find a vast array of computer models and designs in use, many of which are not compatible with one another. In northwestern Ontario, for example, software packages being developed for microcomputers in provincial schools are not compatible with the current microcomputers in many of the federal or band-operated schools. It is unlikely that those schools will be able to afford to switch to the provincial models, having recently purchased their own at considerable expense.

New technologies such as Telidon/videotex, and videodiscs have not made headway in band, federal, or provincial schools in Canada, owing to high capital costs and the lack of culturally sensitive software. At a time when budgets are tight, the fear of technological obsolescence is making educators in many school systems wary of investing substantial funds in new communications and information technologies for classroom use.

A few federally funded experiments involving Telidon technology may ultimately have an impact on native formal education. Brandon University, for example, is using Telidon technology to develop and deliver training programs to rural and northern areas of Manitoba with substantial Indian and Métis populations. The Saskatchewan Indian Community College has begun experimenting with Telidon to create its own text and graphic pages. They are also exploring the possibility of developing a Telidon information service for community and educational purposes to link all Saskatchewan Indian reserves. Although it is too early to determine the outcome of these new endeavors, some Telidon field trials involving native people in formal educational settings have not been entirely successful.[32]

COMMUNICATIONS AND INFORMATION TECHNOLOGIES: NONFORMAL EDUCATIONAL APPLICATIONS

Early developments in native communications

The late 1960s saw a marked increase in native organizing across Canada, much of it in reaction to the assimilative policies and programs of the dominant society. As Inuit and Indian groups organized to fight their battles in the political arena, a cultural rebirth occurred in the form of strengthened identity and cultural awareness. Native leaders became increasingly aware of the relationship between communications and cultural development and began to demand access to the new communications technologies.

The late 1960s and early 1970s witnessed the growth of native communications societies largely funded by the federal government. These societies were often attached to provincial, territorial, or tribal native associations. In the beginning, most turned to the print medium and a number of native newspapers were born. These provided Indian readers with news and information on political and economic development and health education. They were often the only source (other than word of mouth) of information relevant to Indian affairs, and as such they were valuable resources in nonformal adult education.

Radio and television were slower in coming. High frequency (HF) radios were first to gain widespread use. They were introduced to Indian and Inuit communities by the missionaries and later, by the police and other federal government officials. HF radio served as a cheap but unreliable means of communicating over great distances. For years it was the only way an isolated community could communicate with the outside world, and thanks to HF, many lives were saved in times of emergency.

One of the first documented and most innovative HF radio projects involving native people in what can be classified as nonformal adult education took place in British Columbia in the late 1960s and early 1970s. The project was developed by the Radio and Visual Education Network (RAVEN) which was the communications society of the Indians of British Columbia.

RAVEN established a two-way HF radio network that linked about 60 Indian communities with a total population of approximately 20,000. The RAVEN project was unique in that it was owned, operated, and maintained entirely by its users. Each community took responsibility for requesting access to the network and for acquiring much of the necessary equipment. The network, which consisted of a central base station, several sub-bases, and a series of satellite stations, was used primarily to exchange information on band affairs. It played an important role in the political development of British Columbia Indians and served as a tool for organizing.

The HF network also provided emergency health care service. At least one individual in each community was trained in first aid and, in the event of an emergency, a doctor could usually be reached at each sub-base station. A phone patch into the RAVEN network enabled the doctors to speak directly to the local health care practitioner or first aid volunteer.

HF radio was not always reliable because of interference caused by certain atmospheric conditions and sun spots; nonetheless, the RAVEN project was one of the first examples of the adaptation of communications technology by native Canadians for practical distance education purposes.

The early 1970s witnessed the growth of native community radio. Most community radio stations were band-owned, surviving on shoestring budgets and volunteer staff. Most were supplied with rudimentary equipment - a small console and a turntable - and used low-powered FM transmitters, some with an output of only one watt. They served useful purposes: messages were passed on to friends and relatives, search parties were organized for missing hunters, and the community's favorite records were played. In most locations, programming was in the native dialect of the region. This added an important cultural dimension to radio communications and paved the way for later, more sophisticated uses of electronic media for educational purposes.

The growth of community radio in Canada was given impetus earIy in the 1970s when the Canadian Broadcasting Corporation (CBC) established a policy supporting community access to the airwaves. The CBC granted local access to autonomous community radio societies for daily broadcasting of local

programming over CBC-owned transmitters at specific times. In some cases, the CBC established affiliate agreements with local native communications societies and provided them with studio facilities. More native communities were able to take advantage of this opportunity after 1974 when the federal government approved the CBC's Accelerated Coverage Plan (ACP), which called for the extension of CBC television and radio service to all communities in Canada with populations of 500 or more.

Although community radio was rarely used by native people for formal educational purposes, it gained widespread acceptance as a means of transmitting important local information, and it provided an essential emergency service. Community radio gave Canada's native people hands-on experience with rudimentary communications technology.

During the late 1960s, new video technology emerged in the form of compact, portable videotape recorders (VTR), which soon proved to be effective tools for community development and social change. In 1967, in collaboration with the Company of Young Canadians, a community development agency created by the federal government, the National Film Board of Canada established a Challenge for Change program with the objective of provoking social change through the use of film and videotape. Although this type of film and videotape use developed slowly among native groups, the videotape experiments of the late 1960s and early 1970s had a lasting impact and provided effective models for use by native people in later years. (For more information on the activities of the NFB and CBC, see Paper 8 in this series.)

In conjunction with its Challenge for Change program and with assistance from DIAND, the National Film Board trained and employed two Indian film crews over a four-year period in the early 1970s. The Indian filmmakers produced several films, some of which documented Indian political development and struggle. The National Film Board also sponsored a number of animation workshops with native people. On Baffin Island, a series of super-8 film workshops led to the formation of Nanatsiakmiut, an Inuit independent film and video production company now based in Frobisher Bay.

One of the most notable early experiments involving native people and the use of television for education and development occurred in La Ronge, a small community in northern Saskatchewan that includes approximately 2,000 Cree Indians. The project was the first documented community television access experiment involving native people. Begun in 1971, it was initially funded by the Anglican Church and the federal Opportunities For Youth program. During its first year, portable videotape equipment was used to produce experimental community programs, which were screened for individuals and for groups at community meetings. In 1972, the project underwent significant change when permission was given by the CBC for access to its local television broadcasting transmitter. (At the time, the CBC was supplying La Ronge with a "Frontier Coverage Package" which consisted of four hours of pre-recorded English network programming each day.)[33] Not only did the CBC provide access to its transmitter, it also supplied half-inch video equipment and maintenance services.

During the first few years of the project, approximately one and one-half hours of local programming were produced each week, mostly in the Cree language. As well as news, sports, and entertainment, programs dealt with local issues concerning the trapping and fishing industry, local elections, and housing. Cree elders were interviewed, and they passed along their wisdom and heritage in the form of stories and legends. Such programs provided valuable learning experiences for natives of all ages.

Federal experiments: 1970-1977

Throughout the 1970s a number of federally sponsored communications experiments laid the foundation for native use of communications technology today. These experiments came about in part because of the lobbying efforts of native leaders who were fearful of the potential impact of "outside" media.

Northern Pilot Project. Between 1971 and 1974, the Department of Communications in Ottawa sponsored a series of experiments called the Northern Pilot Project, which was designed to determine the communications needs of indigenous people living in isolated regions. The experiments involved

native people in the planning, operation, and evaluation of their own communications systems.

One project was based in Baker Lake, a small inland Inuit community in the Keewatin District of the Northwest Territories. An HF radio network was established linking Baker Lake to four neighboring Inuit communities - Chesterfield Inlet, Rankin Inlet, Whale Cove, and Eskimo Point. Although it was not a highly reliable communication system, when the atmospheric conditions were right the Baker Lake HF network was used for exchanging messages and acquiring information on events in the Keewatin region. It provided the only inexpensive means of communication between Keewatin settlements.

The experiment in Baker Lake also involved the establishment of a local FM community radio station, which proved even more popular than the HF radio in meeting local needs. For the first time in Baker Lake, intracommunity radio communication was made possible and the potential for local broadcasting in Inuktitut was realized. Project organizers also introduced the Baker Lake Inuit to portable videotape recording technology, which proved most effective when it was used for HF radio training and for documenting hunting events and community meetings.

A second experiment took place in northwestern Ontario, where 16 predominantly Cree and Ojibway communities were eventually linked by HF radio. As an experimental project designed to provide a communications network for isolated communities, it was successful. It provided a cheap means of relaying vital messages and exchanging valuable information on such topics as aircraft movement, weather, government, and band affairs, and the progress of patients at the district hospital in Sioux Lookout.

According to the project evaluator, both the Keewatin and the northwestern Ontario experiments helped to increase native users' understanding of the various forms of communications technologies and their potential applications in remote areas.[34] In doing so, the experiments helped pave the way for the adaptation of more sophisticated technologies such as satellite distribution of radio and television programs.

The Hermes experiments. In 1976, Canada, in cooperation with the United States, launched the Hermes satellite, designed to provide interactive communications for experimental projects of a social nature. Three of the experimental projects in which new communications technology was used for nonformal distance education are described below. (For more information on the use of satellites in education, see Paper 12.)

- Naalakvik I. Taqramiut Nipingat Inc. (TNI) was formed in 1975 to develop communications services for the Inuit of Arctic Quebec. In 1977, TNI submitted a proposal for an interactive radio network linking eight communities in northern Quebec. Five already had telephone communication via the Anik A satellite, launched by Canada in 1972. TNI used the Hermes satellite to provide communications services to an additional three communities and joined the two systems at a small radio production centre at Salluit, near the northern tip of Quebec. This made it possible for TNI to provide Inuktitut radio programs to the two networks and to make available to both networks programming produced in the individual communities.

The new service met with a great deal of enthusiasm from its users. News and discussion broadcasts dealt with a wide range of issues. Talk shows proved most popular. More than half of all discussions centred on political topics and education, the two issues related to the James Bay Agreement, the comprehensive land claim settlement recently signed by the Northern Quebec Inuit Association and the federal and provincial governments.[35]

Although the operational phase of Naalakvik I lasted only through October and November 1978, the experiment demonstrated the value of interactive communications facilities and set the stage for future radio and television services under the direction of TNI.

- Wa Wa Ta Satellite Radio Network. The Hermes satellite enabled Wa Wa Ta, the native communications society serving northwestern Ontario, to establish an interactive radio network throughout the summer months of 1978. A production centre was established at Sioux Lookout and one-metre terminals were installed at Sioux Lookout, Sandy Lake, Big

Trout Lake, and Fort Hope. By patching into the local community FM stations, everyone in the community received the network programming.

For some Cree and Ojibway in the isolated northern communities, the technological capabilities of the satellite were almost beyond belief. David Forsee, the project producer for Wa Wa Ta, explains:

> The idea of a network is foreign to communities located in the remote north. People are aware that they share the land space with other communities and there has, traditionally, been a significant amount of travel and exchange between these places. But the idea that one community station could be linked up with another and another and another and that each could hear the other and that all this happened by way of an iron star floating thousands of miles up in the sky, really seemed awesome, at first.[36]

The experiment coincided with the public hearings of Ontario's Royal Commission on the Northern Environment (the Hartt Commission), which looked into controversial land use issues of particular interest to the native northerners who feared the destruction of their land base. Although Wa Wa Ta was contracted by the Commission to provide a wide range of media coverage to the northern reserve communities, little coverage actually took place as the work of the Commission was curtailed shortly after Wa Wa Ta began broadcasting.

Without the constraints imposed by the formal Royal Commission hearing process, Wa Wa Ta was able to develop a more informal and distinctively northern broadcasting service. The Hermes satellite provided the vehicle for intercommunity discussion and learning. Topics such as traditional medicine ceremonies, Christianity, land use, and Indian control of education proved most popular. Native people living in isolation were able to bridge great distances and come together on their own terms through music, news, discussion, stories, and humor. The Department of Communications priority was to prove the technological capability of the satellite system, but the human interaction and development capacities were what captured the imagination of the Cree and Ojibway of northwestern Ontario.

• Project Iron Star. Of the three Hermes community interaction projects involving native people, Project Iron Star was, from an educational perspective, the most ambitious. Managed by the Alberta Native Communications Society (ANCS), it added a video dimension to Hermes' interactive capabilities.

The ANCS operated out of a production centre in Edmonton where a three-metre earth terminal was installed. The society had planned to link 20 communities in all. However, because of bureaucratic delays, only three other terminals were established - at Fort Chipewyan, Demarais-Wabasca, and Assumption.

Video programs were prepared by ANCS staff at their Edmonton production studio and in the field using portable video equipment. In the period from May to November 1977, programs were packaged and broadcast to the three outlying communities, and the audiences participated in the discussions which followed by means of a telephone hook-up via Hermes.

Some of the programming during the day was directed at young native people in the school system. Included were films about native people, a soap opera, and a Cree language course. Teachers and students were able to participate in follow-up discussions and commentary through Hermes' teleconferencing capacity. Evening broadcasts carried public service programming, which involved a variety of native and non-native agencies. Topics ranged from alcohol and drug abuse to gun control and women's issues.

Project Iron Star made a number of contributions to Indian adult education and community development. Larry Desmeules, the former executive director of ANCS, cites two examples:

> In Wabasca-Desmarais, where some natives were considered to be squatters on land they had inhabited for generations, we provided programming advising them how to secure land tenure. And in Assumption, natives' apprehensions over housing development delays due to flooding were eased through a regular flow of information.[37]

THE ANIK B EXPERIMENTS AND NATIVE EDUCATION

The Inukshuk Project

Development and Implementation Phases. Although shortlived, the Hermes experiments demonstrated the technical feasibility of interactive satellite communication in remote areas and the usefulness of the new technology in communications, education and medical services. In 1978, Canada launched the Anik B satellite and began a series of experimental programs to build on the Hermes projects. Of all of the Anik B experiments, the most successful was that mounted by the Inuit Tapirisat of Canada (ITC), the national Inuit association.

Called "Inukshuk" after the human-like stone cairns that were among the first Arctic aids to communication, the project took place between 1978 and 1981. Funding totalling $1.9 million came from the Department of Indian and Northern Affairs to cover the direct costs related to construction of studios and production centres, Inuit staff training, videotape distribution, and the costs associated with the interactive experimentation phase of the project.

For the Inuit, this was a quantum leap into the communications future. Communication had always been a concern in the sparsely populated vastness of the North. With new knowledge gained from previous experiments, and a disdain on the part of some for the culturally irrelevant southern television programming now reaching many communities, the Inuit embarked on their Inukshuk Project with a sense of urgency.

The first interactive broadcast, in September 1980, was preceded by two years of planning and preparation. Plans called for the Anik B satellite to link Arctic communities spanning thousands of kilometres and two time zones. Video production studios were constructed in Frobisher Bay on Baffin Island and in Baker Lake in the Keewatin region. Audio-video transmission and reception facilities were installed in Frobisher Bay. Video and audio receive/audio transmit equipment was placed in Cambridge Bay, Baker Lake, Eskimo Point, Igloolik, and Pond Inlet, thus creating a one-way video and two-way audio teleconferencing network (see Figure 2).

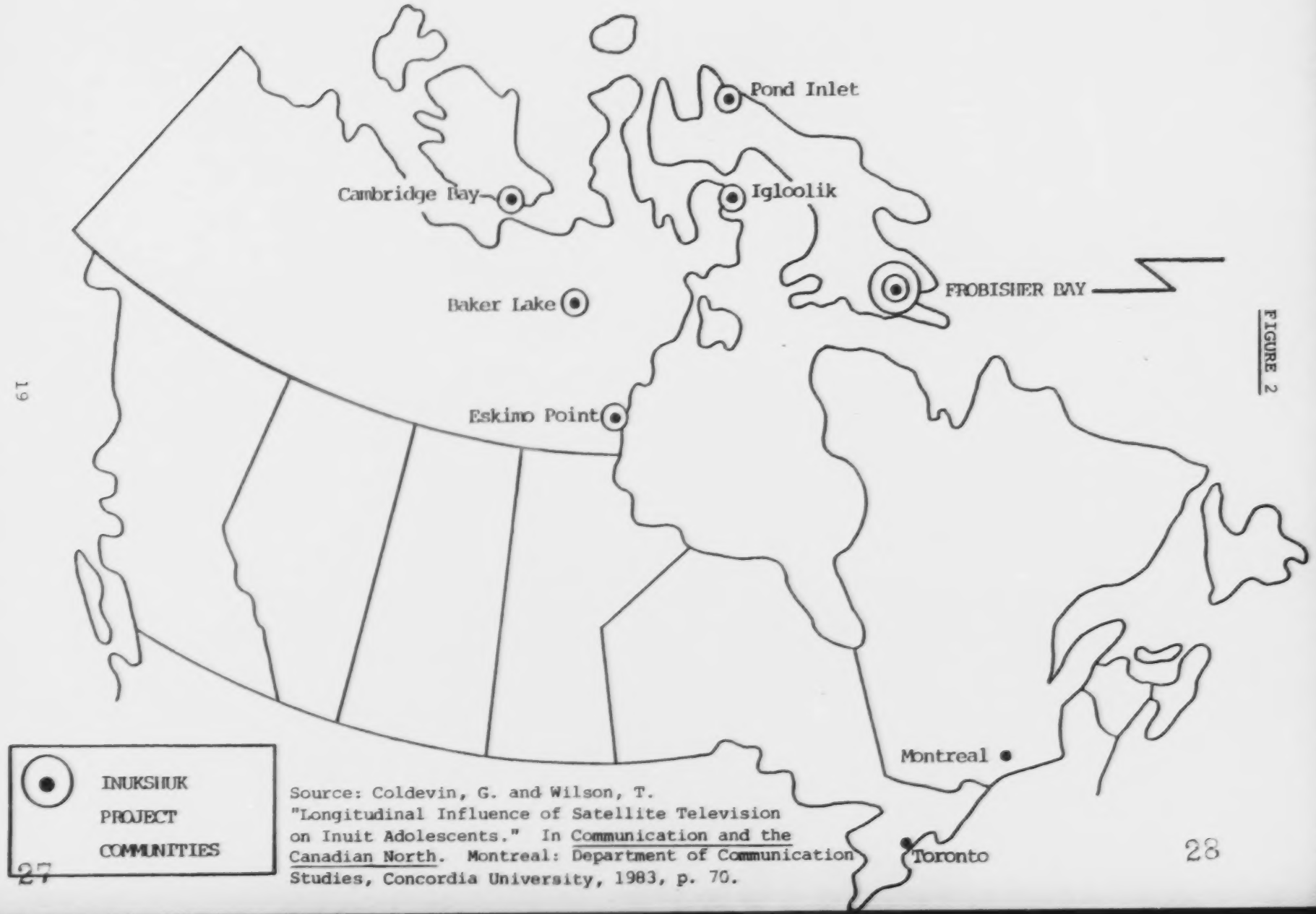


FIGURE 2

Source: Coldevin, G. and Wilson, T. "Longitudinal Influence of Satellite Television on Inuit Adolescents." In Communication and the Canadian North. Montreal: Department of Communication Studies, Concordia University, 1983, p. 70.

Training began on the day the project was approved. Regional coordinators were hired and briefed, and production teams were given 16 weeks of film and video training. Five months before Inukshuk started broadcasting, community organizers began working in their settlements to help their people prepare programs and discussion topics for the interactive meetings. All video programs produced in the five outlying communities were transported to the uplink site at Frobisher Bay for broadcasting.

The Inukshuk Project was designed and implemented to maximize local participation and control. In each of the six communities, Inuit gathered in council offices or community halls equipped with large video screens. Five of the six communities re-broadcast the signals to individual homes by means of local transmitters. Igloolik, which had twice refused the CBC's offer to provide television service, restricted reception to the local hamlet office, the adult education centre, and the school.

Once operational, Inukshuk was on air for 16½ hours each week for eight months with a mixture of teleconferencing and broadcasting. The broadcast programs included films and live and pre-taped material about Inuit and the North, much of which had never been seen by Inuit before.

Inukshuk tested the Anik B satellite for a variety of uses, including adult education, children's education, Inuktitut broadcasting, and interactive meetings. This diversity is reflected in a description of programs broadcast during October and November 1980:

> Interactive programs have been held among the Hunters and Trappers Associations to discuss game management and control and among the Health committees to exchange information on preventive health. The government of the Northwest Territories has met with the local education committees for input on education standards and curriculum development. Adult education has included a 10-part series on how to cook food from the land and its nutritional value. Elected representatives have met with their constituents over the network to discuss matters that are before the Territorial Assembly. Programming done for local transmission only has emphasized community issues. Inukshuk staff, in both Baker Lake and Frobisher Bay, televised an all-candidates' debate prior to

municipal elections with a live phone-in show. Baker Lake provided detailed, up-to-the minute coverage of the election returns on the evening of the election.[38]

One of the most successful children's education experiments consisted of an exercise in which young people from each of the six Inukshuk locations prepared community profiles. Each community presentation was followed by a question-and-answer period in which the children discussed their communities' similarities and differences. The experiment was a demonstration of successful peer teaching at a distance by means of teleconferencing.

Some of the interactive meetings provided a forum for adult education. On one occasion, nurses' aides broadcast a program on community health and nutrition, which was followed by a lengthy participatory discussion with Inuit women from across the Northwest Territories.

Inukshuk facilitated adult awareness of important northern political matters. On one occasion, members of the Territorial Legislative Assembly led a debate on the issue of territorial division and the establishment of a more representative government for Inuit. One of the most popular programs linked the six NWT communities with four Inuit communities in northern Quebec for a discussion of aboriginal rights issues in relation to the federal government's constitutional reform proposals.

In all, approximately 324 hours of satellite time were used for the Inukshuk Project, of which 164 hours were live, mostly interactive meetings.[39] Many of these meetings involved local committees whose members could not afford to travel great distances in order to meet with their counterparts. It is noteworthy that the most frequent users of Inukshuk were the young and the old, those most affected by rapid social change in the North.[40]

Educational and developmental implications. The interactive element of Inukshuk contributed most to its success as an educational and developmental experiment, for in the sharing of information lie the seeds of social action and change.

In her assessment of the Inukshuk Project for the Inuit Tapirisat, Gail Valaskakis notes:

> The community-level use of interactive technology may allow Inuit a realistic opportunity to adapt social institutions to respond to the problems of their communities.
>
> The social history of the North clarifies the importance of understanding development as a participatory process, a process in which local people control the pace and direction of the changes affecting them. Inuit interactive experiments suggest that specific media can play an important role in the self-development of northern communities.[41]

The Inuit Broadcasting Corporation. In 1980, the Canadian Radio-television and Telecommunications Commission (CRTC) established a special Committee on the Extension of Service to Northern and Remote Communities. Headed by Réal Therrien, a permanent commissioner of the CRTC, the Committee conducted public hearings in the North and in the South to solicit the views of interested parties on the extension of television services in northern and remote areas. Many Inuit intervened at the hearings and argued vigorously for local control over media entering their communities and for culturally appropriate programming. In Baker Lake, the Inuit Tapirisat of Canada (ITC) presented a proposal to the Committee calling for the establishment of an Inuit broadcasting system.

The Therrien Committee report supported the ITC's proposal, and in 1981 the Inuit Broadcasting Corporation (IBC) became a reality. The ITC's proposal was approved for an initial two-year period. The IBC was licensed to provide an Inuktitut television service sharing the CBC's Anik B transponder and northern schedule.

Although the IBC was now able to broadcast about five hours of television programming each week to 27 Inuit communities in the eastern Arctic, the new service lacked the interactive flexibility that existed under Inukshuk. Without the capacity for active community participation and feedback, the full educational and developmental potential of the new technology could not be realized.

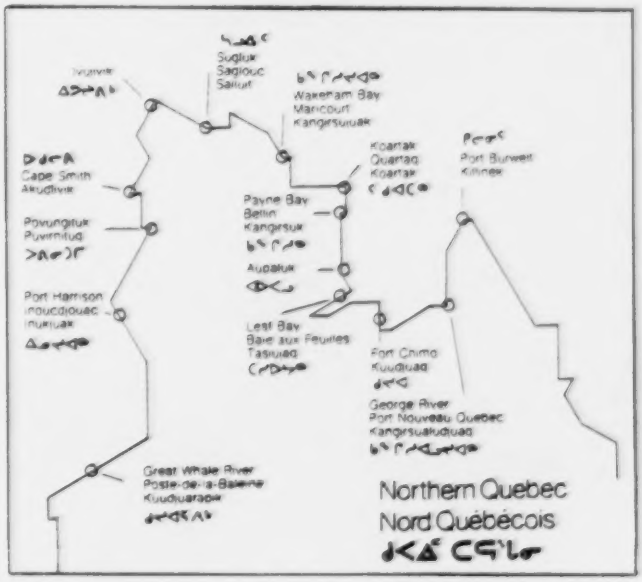
Naalakvik II

At the same time as the Inukshuk Project was beginning in the Northwest Territories, a complementary Anik B project was taking shape in Arctic Quebec. Called Naalakvik II, the project was coordinated by Taqramiut Nipingat Inc. (TNI) with about $900,000 of funding from the Department of Indian and Northern Affairs between 1979 and 1981.

Naalakvik II differed from the Inukshuk project in that it introduced the Inuit of northern Quebec to television for the first time. Unlike many Inuit communities in the Northwest Territories, which began receiving CBC television service in the early 1970s, the Inuit of northern Quebec had flatly rejected the service until provisions could be made for substantial amounts of Inuktitut programming.

Plans called for linking five Arctic Quebec communities via the Anik B satellite in an interactive communications network with program production and transmission facilities in Salluit (see Figure 3). In order to accomplish this goal, tons of equipment had to be purchased and installed, an Inuit production crew trained, and preparatory work conducted in each northern community and in the South, all within less than one year. The lack of year-round airstrips in many northern Quebec communities made the task especially formidable.

FIGURE 3



Source: Taqramiut Nipingat Inc. Inuit Communications in Northern Quebec. Ottawa: Taqramiut, Nipingat Inc., June 1976, p. 3.

The first phase of the project was designed to familiarize Quebec Inuit with the various ways television technology could be used for local purposes. Low-powered television transmitters were installed in Kuudjuarapik (Great Whale River), Inukjuak (Port Harrison), Salluit (Sugluk), Kuudjuaq (Fort Chimo), and Kangirsualudjuaq (George River). Videocassette recorders were connected to the transmitters, and every day TNI mailed each community cassettes containing about six hours of programming that had been copied from local channels in Ottawa. Care was taken to include children's programming, documentaries on the North, and some French-language programming. Programs with excessive violence were avoided. Commercials, for the most part, were edited out.

Programs in Inuktitut were also provided by TNI production trainees in Salluit. These programs focussed on community leaders, local organizations, and traditional skills such as kayak and sled building, snowhouse construction, and animal skinning. Audience surveys were conducted in each community to determine viewing patterns, program preferences, and the impact of the new medium on local social and cultural patterns. This information provided TNI with guidelines for choosing educational and entertainment programs from the South and for producing its own programming.

TNI provided each community with a television camera, which made it possible to televise community events. The first live local broadcast reported was the swearing-in of Salluit's first mayor and municipal council. Subsequently, local television facilities were used regularly by community health officers, educators, municipal councillors, and visitors. Often, the telecasts included telephone feedback from viewers so that some programs developed audiovisual "hot-line show" formats. The community television packages enabled women with children, the elderly, and others who could not leave their homes to participate in important community events and to have access to vital community information.

By October 1980, when the satellite phase of the project began, a team of about a dozen Inuit television producers and technicians had been trained and a number of programs completed and ready for broadcast. The production centre at Salluit was equipped with video and audio transmit/receive

facilities. The remaining four communities participating in the project were each supplied with video receive equipment and facilities for audio transmit/receive. For the next six months each community received an average of seven hours per week of Inuktitut programming uplinked to Anik B from Salluit. Using network programs mailed from the South and the occasional local program, most communities broadcast for about nine hours each day. The audience response to the service was remarkable: the average viewing time was six hours per day and 91 per cent of the Inuit surveyed said that their television sets remained on as long as there was transmission.[42]

Although the production of TNI's programming was centralized in comparison with that of the Inukshuk project, it was equally innovative. Along with a steady fare of programs dealing with various aspects of Inuit culture and public affairs, TNI broadcast several translated versions of National Film Board films and, at least once each week, a translation of current national and international news. This last service was made possible by the federal Department of Communications, which agreed to transmit the English news service from Ottawa to Salluit via satellite where it was then translated and re-broadcast the same evening. This was one of the most popular initiatives. For the first time, instant images and information were transmitted from around the world in the local dialect. This service alone helped to fill a wide information gap and justify the introduction of television to the North.[43]

Most of the Naalakvik II Inuktitut programming was concerned with public affairs; about one-third of the programs were talk shows.[44] These programs, which covered a host of important political and social issues faced by the Inuit of northern Quebec, usually resulted in telephone responses from the audience. Of particular interest to many were two programs dealing with Inuit presentations to a special committee of the Senate. This type of programming helped to generate a stimulating, active learning environment utilizing the full interactive capacity of the Anik B satellite.

One of the goals of the Naalakvik II project was to conduct experimental educational programming for school children. This was accomplished with the assistance of the Kativik School Board and the Quebec Department of Education.

Between October 1980 and February 1981, the Kativik School Board prepared a number of programs that included interviews with northern school board members and Inuit students living in the South. Some programs focussed on elementary school education in Arctic Quebec. One program from Salluit enabled teachers there to discuss common problems with their peers in the four other communities linked by satellite. In addition, parents were provided with a unique opportunity to witness classroom instruction without leaving their homes.

The Kativik School Board productions spanned three languages - Inuktitut, English, and French. Perhaps Kativik's most popular program was a quiz challenge series involving several schools from the region, much along the lines of the popular CBC program, "Reach for the Top."

Naalakvik II came to an end in the summer of 1981 when funds ran out. The project demonstrated TNI's ingenuity in the broadcasting field and led to the creation of an on-going television production facility in northern Quebec as part of the IBC's Arctic network. Like most experiments, Naalakvik II was in itself an important learning experience which, among other things, made the project participants well aware of the enormous expense and effort required to produce television programming of educational value to the Inuit of northern Quebec and of sufficient quality to compete with entertainment programs from the southern networks.

RECENT INITIATIVES AND FUTURE TRENDS

The Inukshuk Project and Naalakvik II were outstanding developments in the field of native communications. To date, no other communications undertaking has demonstrated such educational innovation. Nevertheless, a number of recent initiatives have made significant contributions to native education across Canada. Some of these are described below.

Microcomputer use at the Quinte Mohawk School

One of the most ambitious schemes for integrating microcomputer technology into the native classroom has been implemented at the Quinte Mohawk School on the Tyendinaga Indian Reserve near Belleville, Ontario. A small federal school with about 180 students from the reserve, the Quinte Mohawk School has more than 20 microcomputers which are used extensively by students from kindergarten to grade eight.

Begun in 1981, the project was inspired by the school principal, who felt strongly that Indian students should have access to the technological training available to non-native students in larger urban centres. Obtaining funding in the early stages of the project took some ingenuity, since DIAND had not budgeted sufficient funds or developed firm policies regarding the acquisition of microcomputers. A proposal was submitted to DIAND for a pilot project in special education designed to serve the educational needs of students with learning disabilities. Special education consultants reported that Mohawk children learned best in a hands-on learning environment that allowed students to make maximum use of their visual faculties and their motor skills. The microcomputer seemed ideally suited to this profile.

The microcomputers - Radio Shack TRS 80s - are used in three ways. Some are set aside in a classroom for special education students; others are mobile and are wheeled into classrooms when required. Students can also book the computers for individualized learning during lunch hours and after school. The teachers report that the students do not seem to tire of using the computers as a learning tool. Some of the grade eight students have now surpassed their teachers in their ability to use the equipment, and have developed

programs for junior students. Graduates, most of whom enter the provincial high school in Belleville, find themselves far ahead of their non-native peers in computer skills. In addition to the intrinsic value of the skills, students benefit from the boost in morale and self-esteem afforded by this competitive edge.

Administrators at the Quinte Mohawk School report that they have only begun to exploit the potential that microcomputers hold for innovative classroom learning. Much more work, they claim, needs to be done to develop appropriate software. Only about 20 per cent of the material they have reviewed to date has proven useful.[45] Existing software now allows the teachers to use the microcomputer for mathematics, science, and language instruction. Among the more popular software packages is a series of metric conversion exercises and a program with a voice synthesizer that allows the student to write out a sentence and to hear the computer read back what has been written. Teachers hope to be able to develop similar programs in the Mohawk language, which is now taught from kindergarten to grade five.

In 1984, the school was the site of a summer course. Designed under the auspices of Brock University, it was aimed at introducing teachers of Indian children to classroom computer technology. Equipment acquired for this program will boost the number of computers available to the Tyendinaga students to about sixty.

Administrators at the Quinte Mohawk School are determined to carve a place for native people in the high-tech future. Plans are being drawn up for a proposal to create a permanent high-tech institute on the reserve that will attract native people and teachers of native students from across Canada.

Educational television

In the last decade there have been major advancements in educational television, particularly in the provinces of British Columbia, Alberta, Ontario, and Quebec. For the most part, however, educational television has not as yet been geared to meet the needs of native populations. Like the provincial educational system in general, educational television has served the interests of the dominant society.

Increasingly, however, educational television is becoming available to native people. For example, in British Columbia, Knowledge Network (Knowledge Network of the West Communications Authority) now reaches about 80 per cent of the provincial population as well as growing numbers of the Yukon and western NWT populations. Knowledge Network offers general interest programs and a wide variety of college and university level courses - everything from an introduction to home computers to gardening instruction. Although the number of native viewers is increasing, no statistics are available on native enrollment and no studies have been carried out to determine the impact of educational television on the native population of British Columbia.

In responding to the needs of the rural native population, TVOntario, with the assistance of the Ontario Ministry of Northern Affairs, is in the process of extending its service to 125 northern Ontario communities. Many of these communities are predominantly Cree or Ojibway, and some have no year-round road service. By means of the Anik C satellite, residents in northern Ontario will receive the same TVOntario programs as are available in the South. Some native communities with populations of less than 500 will be receiving their first television service. TVOntario representatives plan to visit many of the native schools to show teachers how to use television in the classroom and how best to adapt it to the school curriculum.

In addition, TVOntario has made an audio subcarrier on its satellite transponder available to Wa Wa Ta, the native communications society based in Sioux Lookout. This will give Wa Wa Ta the capacity to provide Cree and Ojibway radio programming to a potential audience of 20,000 Indian people in about two dozen northwestern Ontario communities. This cooperative effort is an example of how native communications societies and provincial broadcasting networks can work together to serve the educational needs of rural native populations.

In comparison with the educational programming available in most urban centres, the Arctic has been greatly underserved. This may change with the Inuit Silattunrsarvingat (University) which is expected to begin offering satellite video and computer link courses in 1988.[46] Feasibility and planning studies for the new university are now underway. The project, which was launched by the Inuit

Cultural Institute at Eskimo Point, Northwest Territories, is aimed at preserving and promoting Inuit culture. Noncredit Inuit studies will include language, mapmaking, law, biology, nutrition, music, and games. Inuit artifacts and tools will be organized into portable travelling exhibits, and plans are underway for a course on Arctic survival. Using the open university concept, the project organizers hope to provide educational programming via a satellite link with all 32 Inuit settlements in the Northwest Territories.

Computer technology and the development of native-language reading materials

New developments in microcomputer technology have created a mini-revolution in the development of native-language reading materials. Many northern native languages are written using a system of symbols called syllabics. This system, which originally used nine symbols, each written in four different positions, was first developed by James Evans, a Wesleyan missionary who worked among the Cree Indians at Norway House in the mid-nineteenth century. Evans' system was adapted to Inuktitut by John Horden and E.A. Watkins, English missionaries to the Diocese of Moosonee.[47]

Inuktitut literature and Inuit literacy were given a boost after 1972 when a new IBM typewriter element and a new Letraset sheet were developed. Prior to that time, except for a few manual syllabic typewriters, writing was accomplished laboriously by hand, and fewer than a dozen books had been printed in Inuktitut.[48] Corrections and editing were still time-consuming, even after the advent of the syllabic typewriter.

As a result of recent initiatives by the Department of Information of the Government of the Northwest Territories and private firms, syllabic film fonts and print wheels have been developed for photo-typesetting and word processing. One such system, the Kirk Inuktitut Syllabic Word Processor, allows the user full word-processing capabilities as well as automatic transliteration from syllabic orthography into Roman orthography.[49] The new technology reduces by half the time required to type and edit Inuktitut copy, and gives Inuit translators greater accuracy and control over their work. The new systems also reduce by half the costs of producing syllabic reading materials. Programs have now been

developed to transmit Inuktitut text by telephone to high-speed, quality photo-typesetters. An automatic proofreading facility will soon be on the market to check Inuktitut spelling in a manner similar to the Spellguard programs currently available for English and French text. A computer dictionary may also be developed which will assist in the translation of text, particularly complex technical terms. Microcomputers can now exchange information in Inuktitut, linking government, native organizations and businesses in Yellowknife, Rankin Inlet, Eskimo Point, Frobisher Bay, Ottawa, and Montreal. This new technology has served to bring Inuktitut closer to the status of a working language.

In the Northwest Territories, where Inuktitut is one of the official languages of the legislative assembly, the new technology should make the business of government and education more efficient. It has already had an impact on Inuktitut curriculum development. Translations of textbooks and reading materials can now be prepared more quickly, and stories and legends from Inuit oral tradition can more easily be put into print.

Teleconferencing

Operating from a base in Yellowknife, Arctic Co-operatives Ltd. (ACL) oversees the operations of some 40 cooperative enterprises spread across the Northwest Territories.

From April 1979 to March 1983, the ACL coordinated a comprehensive training program to support the development of Dene (Indian and Métis of the Northwest Territories) and Inuit cooperative managers. Part of the training program, which consisted mainly of workshops and seminars, involved "teletraining" using Darome teleconferencing units. When connected to the telephone, the Darome units, which are about the size of a small suitcase, allowed as many as four or five trainees from each community to participate in a teleconference training session. The NWT telephone system allowed for only five communities to be connected at one time, but when a "bridge" was supplied at the University of Wisconsin, eight or more communities were able to participate. When the bridge was used, the audio quality of the telephone line was in most cases superior to the regular

phone system.[50] (See Paper 14 for more information on teleconferencing.)

Early courses dealt with such topics as money management, family budgeting, credit, and interest. One of the objectives of the first teleconference courses was to develop the verbal skills of trainees. The technology was ideally suited to this purpose. Later courses, some of which were accredited by the University of Regina, dealt with accounting principles and practices.

One of the objectives of the training program was to enable trainees living in isolated areas to keep in touch and to provide the opportunity for weekly communication between the trainees and the ACL training staff. Teleconferencing proved highly suited to these tasks. The most important contribution made by the teleconference technology was to cut down on costly northern travel and accommodations as well as lost working hours due to travel time. Ironically, at approximately $85 per hour per community, the system proved too expensive to maintain when funds for the teleconferencing portion of the program were exhausted.

Kaminuriak Herd film/video project

In 1980, a dispute developed in connection with the use of Kaminuriak Herd caribou in the Keewatin Region of the Northwest Territories. The dispute involved marked differences of opinion and perception among Keewatin Inuit on the one hand and game managers and biologists on the other. The biologists and game managers, who feared the depletion of the herd, were pressing for stricter hunting controls. However, Inuit from the region were by no means convinced that the Kaminuriak Herd was shrinking. They saw their traditional knowledge being challenged by outside "scientific" data and their way of life being threatened. The dispute aroused a great deal of passion and controversy.

To help bridge the communication gap and create a new climate of understanding, the Department of Indian and Northern Affairs commissioned Donald Snowden to conduct a film/video project using techniques he had successfully employed in similarly polarized circumstances in Newfoundland. Called the "Fogo Island process," the technique was developed by Snowden, an employee of Memorial

University Extension Services, and the National Film Board in 1967. Film and video were used to provide an in-depth examination of issues in a nonconfrontational manner.

Once support for the Kaminuriak Herd film/video project had been obtained from both the Inuit and the biologists, filming and videotaping began. Biologists, game managers, and caribou experts were interviewed across the Northwest Territories. Inuit representatives were interviewed in Eskimo Point, Whale Cove, Rankin Inlet, and Baker Lake. Some interviews were conducted on the land with Inuit hunting parties. Lorne Kusugak, the Inuk project coordinator, made all of the local arrangements and assisted in the interviewing, editing, narration, and translation of the tapes. After the material was assembled in rough form, it was shown to each interviewee for approval. Individuals retained the right to make changes in the videotapes before finished copies were made.

English and Inuktitut versions of each interview were produced; there were 33 programs in all. The videotapes were screened in separate meetings and at specific public gatherings where both sides in the controversy were represented. While it is difficult to measure the tapes' impact, the public discussion that followed engaged a large proportion of the Keewatin population.

Those most closely involved in the project claim that the videotapes contributed to a new spirit of cooperation. One concrete result was the creation of the Caribou Management Board, made up of native and non-native representatives. This Board now coordinates the management of the animals in the interests of traditional users and others who view the herd as a valuable renewable resource.

From an adult education perspective, the project was a unique example of how communications technology can be used in an informal learning situation. By using video technology, participants were able to create new knowledge, share the same events from different perspectives, and interact in a dynamic learning environment.

The 33 tapes reveal a wealth of knowledge about the Kaminuriak Herd and its use by Keewatin Inuit. They are now being used as part of the curriculum in some NWT schools, and

are available for distribution throughout Canada from the Inuit Broadcasting Corporation in Ottawa.

The Northern Native Broadcast Access Program

The Northern Native Broadcast Access Program (NNBAP), a federal program announced on March 10, 1983, holds new potential for native education. Administered by the Secretary of State, the NNBAP is a $40.3 million radio and television production fund to be shared over a four-year period by 13 northern native communications groups.[51] The region covered by the program (see Figure 1) is approximately 70 per cent of Canada's land area. The population of just over one million includes an estimated 24,000 Inuit and 174,000 Indians and Métis who speak 17 aboriginal languages.

NNBAP funding could allow each native group to produce up to 20 hours of radio and/or five hours of television per week by 1986-87. Under the new Northern Broadcasting Policy announced at the same time as NNBAP, existing northern broadcasters, such as the CBC and Canadian Satellite Communications Inc. (CANCOM), will be obliged to carry the native programming on their northern networks.

The rationale for the NNBAP and the Northern Broadcasting Policy came from a strong native lobby for the protection and enhancement of their cultures. Native people successfully argued that most federal initiatives, such as the Anik program, the CBC Accelerated Coverage Plan, and the licensing of CANCOM, had done little to serve native broadcasting needs other than those of the Inuit of Arctic Quebec and the eastern Northwest Territories. They claimed that the new satellite communications technology, with its capacity to deliver vast quantities of American and southern Canadian programming, represented an unprecedented threat to the integrity of their languages, values, and traditions. Pointing to the success of the Inuit Broadcasting Corporation and Taqramiut Nipingat Inc., the native organizations convinced policy-makers that they themselves could produce programming that would meet the needs of their people more cheaply than the professional production crews of the CBC.

Under the terms of the NNBAP, the native communications organizations are encouraged to do most, if not all, of their broadcasting in native dialects. In this respect, the NNBAP

represents an important turning point for native-language broadcasting. Before the NNBAP, little native-language broadcasting existed, with the exception of community radio and the regional radio service provided by the CBC in northern Quebec and the Northwest Territories. As well, this was the first time that native people other than the Inuit had received radio and television production funding of any significance.

The NNBAP has important implications for native education. Programming should serve to reinforce cultural identity and the use of native languages. Under the guidelines established by the NNBAP, native broadcasters will be encouraged to produce educational programming for children. Some groups, such as the Inuit Broadcasting Corporation, have already drawn up proposals for programming aimed at the young, who form the largest portion of their audience.

Perhaps most important, the NNBAP provides northern native people with a degree of control over at least some of the information entering their communities through electronic media. Without this control, they face the danger of becoming spectators to their own cultural disintegration.

ISSUES AND CONCLUSIONS

Communications satellites and microcomputers offer native Canadians the potential for major advancements in formal and nonformal education. However, as past experiments and projects have indicated, the technology also has the potential to subvert the distinct identity of native people. This raises important issues about how new technologies are to be used and who is to control the information they transmit.

The need for native access and control

Will native people have access to new communications technologies? To date, native people have had a number of opportunities to test new communications technologies on an experimental basis. Whether they will have access on a more permanent basis depends to a great extent on the largesse of the federal government. The Northern Broadcasting Policy and the Northern Native Broadcast Access Program are encouraging developments.

Much more needs to be accomplished in order to allow native people levels of service and opportunity similar to those enjoyed by many urban Canadians. These disparities are particularly acute with respect to new communications technologies for formal education. The microcomputer project at the Quinte Mohawk School is an exception, and similar work is required on a massive scale across Canada.

The high cost of advanced communications technologies[52] mitigates against their use by native Canadians. Indians and Métis remain among the poorest and most disadvantaged of Canadians.[53] Given the fact that many native families still lack the basic amenities most Canadians take for granted - running water, sewage disposal, and comfortable housing, for example - it is questionable whether scarce funds will be spent for computers, videotex systems, teleconferencing, and other technological innovations in the near future.

What information will become accessible to native people as a result of new technology? The accessibility of information is of as much concern to educators as is the

accessibility of the technology required to transmit it. According to Innis,[54] the power to store information and to determine whether or not the public should have access to it is an important aspect of knowledge monopoly. This raises fundamental questions for native people regarding control of the content and flow of information. How can they increase their control when they lack effective political influence, a solid economic infrastructure, and a foundation in formal education?

Will native people have any influence over the information entering their communities? In the past, native people have had little influence over the content of information available to them through electronic media. And, until recently, they have not had opportunities to provide their own alternatives.

Without options for local input and control, the new communications technologies may reinforce a producer-consumer relationship whereby native people become passive consumers of information prepared by large media corporations, publishing organizations, and curriculum specialists for the large non-native urban market.

The Kaminuriak Herd film/video project underlined the need for local people to question the validity of outside information and expertise. The prospective Inuit Silattunrsarvingat (University) project and the Northern Native Broadcast Access Program may help to provide constructive alternatives to offset the powerlessness that many native people feel in the face of "outside" information and knowledge.

The need to exploit the interactive capacity of new technologies

The Hermes and Anik B experiments demonstrated the participatory development benefits of interactive technology.[55] Educators agree that effective distance learning should involve structured feedback;[56] otherwise, communication is limited to a one-way flow of messages. Without interactive capacities, new technologies may not allow for effective community participation, a basic criterion for the political, economic, and social development of Canada's native population. While the native broadcasting

initiatives of the past have paved the way for new federally funded programs, it remains to be seen whether more interactive educational and development programming will be forthcoming.

The need for culturally appropriate software

The need for culturally appropriate software to accompany the development of hardware technologies has been a constant theme of the demonstration projects and experiments described in this paper. The rapid proliferation of English-language television and radio programming now available to native communities has resulted in a sense of urgency accompanying present efforts to revitalize native language and culture. As John Amagoalik, president of Canada's national Inuit organization, states, "The introduction of television has meant the last refuge of Inuit culture, the home, has now been invaded by an outside culture."[37] Native people must recognize radio, and especially television, as seductive instruments of acculturation, and must work toward harnessing the media for their own cultural enrichment and educational growth.

Similarly, the danger exists that the curricula and software packages accompanying new communications technologies for the classroom may undermine native values and alienate native learners. Again, a greater investment of resources is required; the Government of the Northwest Territories has set a laudable example.

As a result of a growing cultural revitalization on the part of many native groups, some significant efforts have been made to stem the tide of "outside" information and to provide culturally appropriate alternatives. The development of syllabic word processors and the emphasis on educational programming as part of the Northern Native Broadcast Access Program are but two examples of how communications technology may serve this end.

The need for further research

Little formal research has been carried out on information and communications technologies and native education in Canada. Much more is required if the

educational potential of these technologies is to be maximized. For example, communications projects need to be monitored and evaluated from an educational perspective, and more work must be done to determine the cultural and educational impact of new initiatives in native-language broadcasting. Applied research is required to produce culturally appropriate software packages for microcomputers, Telidon, and other new technologies in native schools. Much more research is needed in the field of distance education for Indians and Inuit living in remote communities. The use of new and traditional communications technologies for native education, and the policies of DIAND require further analysis in the light of the general imbalance of technological learning resources between federal Indian schools and those of the provinces.

Future goals

For the most part, native Canadians have welcomed opportunities to experiment with technologies and have used modern communications technologies in innovative ways for their social and educational advancement. The projects described in this paper are exceptional. They represent an extraordinary effort on the part of a small and dedicated group of native educators and communicators.

While the experiments and programs of the past 15 years have provided a solid beginning, much more remains to be done if information and communications technologies are to deliver the educational services envisioned by some native groups:

> Our dream is to develop an Inuit communications system that will enhance the strength and dignity of our people. We can imagine, for example, our children learning the history and culture of their own people and own land through material prepared by Inuit educators and fed to schools via satellite. We can see nurses and nurses' aides in community nursing stations providing expert care to young and old through consultations via satellite with specialists in far-away hospitals.
>
> We see community radio stations accessing extensive libraries of tapes of Northern songs and stories, and receiving instant news reports on issues of Northern concern. Many meetings will be held by tele-conference,

with everyone staying put in his or her home community. The need to travel will be reduced, and people will spend more time with their families and attending to community affairs.[58]

NOTES

1. Burnaby, Barbara. Language in Education Among Canadian Native Peoples. Toronto: OISE Press, 1981, p. 21.

2. See the following, for example:

   a) Canada. Department of Indian Affairs and Northern Development. Indian and Inuit Affairs Program. Indian Conditions: A Survey. Ottawa: Department of Indian Affairs and Northern Development, 1980;

   b) Canadian Education Association. Recent Developments in Native Education. Toronto: Canadian Education Association, 1984;

   c) Legislative Assembly of the Northwest Territories. Special Committee on Education. Learning: Tradition and Change in the Northwest Territories. Yellowknife: Government of the Northwest Territories, 1982;

   d) Ontario Task Force on the Educational Needs of Native Peoples. Summary Report. Toronto: June 30, 1976;

   e) Stanbury, W.T. Success and Failure: Indians in Urban Society. Vancouver: University of British Columbia Press, 1975.

3. Coombs, P.H., Prosser, R.C., and Ahmed, M. New Paths to Learning for Rural Children and Youth. Essex, Connecticut: International Council for Educational Development, 1973, p. 11.

4. Ingle, H.T. Communication Media and Technology: A Look at Their Role in Non-Formal Education Programs. Washington: Academy for Educational Development, 1974, p. 3.

5. Canadian Education Association. Recent Developments, 1984, p. 9.

6. The Indian Act, first passed in 1876 and later revised in 1880 and 1951, is the federal legislation which spells out the responsibilities of the Government of Canada toward native people. These responsibilities were inherited from the British colonial government through its treaties with the native people of Canada and through subsection 24 of section 91 of the British North America Act.

7. Canadian Education Association. Recent Developments, 1984, p. 9.

8. Ibid., p. 14.

9. Ibid.

10. Ibid., p. 7.

11. Ibid., p. 16.

12. National Indian Brotherhood. Indian Control of Indian Education. Ottawa: National Indian Brotherhood, 1972.

13. Canadian Education Association. Recent Developments, 1984, pp. 82-83.

14. Canada. Department of Indian Affairs and Northern Development. Indian and Inuit Affairs Program. Indian Conditions. 1980, pp. 2, 49, 59.

15. Canada. Department of Indian Affairs and Northern Development. Indian and Inuit Affairs Program, Education and Social Development Branch. Indian Education Paper Phase I. Ottawa: Indian Affairs and Northern Development, 1982, p. 19.

16. Canadian Education Association. Recent Developments, 1984, p. 20.

17. Mullins, G.A. Director of Education, Ontario Region, Department of Indian Affairs and Northern Development. Personal correspondence, 31 August 1983.

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20. Moscovitch, Arlene. "Children and Media: Whitefish Bay Reserve." Pot Pourri, National Film Board Newsletter. Spring 1977, p. 13.

21. Crane, Dennis. Personal correspondence, 10 March 1983.

22. Friesen, A.H. Director, Education, British Columbia Region, Department of Indian Affairs and Northern Development. Personal correspondence, 26 July 1983.

23. Foss, F. Regional Superintendent of Elementary and Secondary Education, Manitoba Region, Department of Indian Affairs and Northern Development. Personal correspondence, 21 July 1983.

24. Granzberg, G. and Steinbring, J. Television and the Canadian Indian. Winnipeg: University of Winnipeg, 1980.

25. Sinclair, G. Director of Education, Saskatchewan Region, Department of Indian Affairs and Northern Development. Personal correspondence, 10 May 1983.

26. Lees, D.J., Assistant Regional Superintendent, Elementary/Secondary Education, Alberta Region, Department of Indian Affairs and Northern Development. Personal correspondence, 21 July 1983.

27. Foss, F. Personal correspondence, 21 July 1983.

28. Alberta Education. Computers in Schools: Report of the Minister's Task Force on Computers in Schools. Edmonton: Government of Alberta, June 1983, p. 43.

29. Mullins, G.A. Personal correspondence, 31 August 1983.

30. Ibid.

31. Ibid.

32. "By far the most ambitious Telidon demonstration project was one that provided delegates at the 1983 Inuit Circumpolar Conference in Frobisher Bay with information relating to the conference itself, Frobisher Bay, and Inuit in general. The Frobisher Bay Telidon terminals were linked to terminals in Alaska, Greenland, and Denmark. However, according to one report, many people were disappointed in the performance of the Telidon demonstration: the monitors in Alaska failed to work, those in Frobisher Bay broke down, individuals complained about the equipment's slow response time, and users were not able to obtain access to the Novatex data bank." (The Arctic Policy Review, October-November 1983, p. 31).

33. In 1973, the Frontier Coverage Package in La Ronge ended and the CBC created a network relay station broadcasting the complete English service from the South via microwave. This meant that the community project no longer broadcast during uncommitted time. Instead, it interrupted CBC network programming, thus setting an important precedent for community television access.

34. Hudson, Heather. Department of Communications, Northern Pilot Project, First Year Evaluation Report. Ottawa: Department of Communications, 1973.

35. Valaskakis, Gail G. "Communication and Participatory Development in the North: Inuit Interactive Experiments." In Communication and the Canadian North. Montreal: Department of Communications Studies, Concordia University, 1983, p. 125.

36. Forsee, David. "Community Communications": The Wa Wa Ta Satellite Radio Network - A Joint Wa Wa Ta/CTS Project. Sioux Lookout, Ontario: Wa Wa Ta Native Communications Society, 1980, p. 4.

37. Hartz, T. and Paghis, I. Spacebound. Ottawa: Supply and Services Canada, 1982, p. 155.

38. Green, L. and Samailak, D. "The Inukshuk Project: Use of TV and Satellite by Inuit Communities in the Northwest Territories." Unpublished paper delivered to the annual meeting of the American Association for the Advancement of Science, Toronto, 1981, p. 12.

39. Valaskakis, G., Robbins, R., and Wilson, T. The Inukshuk Anik B Project: An Assessment. Ottawa: Inuit Tapirisat of Canada, 1981, p. 302.

40. Valaskakis, G. "Communication and Participatory Development in the North," 1983, p. 130.

41. Ibid., p. 134.

42. Foy, Evelyn. Evaluation Report on the Naalakvik II Project. Ottawa: Taqramiut Nipingat Inc., 1981, p. 57.

43. Ibid., pp. 52, 62, 63.

44. Ibid., p. 41.

45. Claus, Ken. Vice-Principal, Quinte Mohawk School. Telephone interview, 15 May 1984.

46. Globe and Mail. Toronto, 12 May 1983, p. 1.

47. Harper, Kenn. "Writing in Inuktitut: An Historical Perspective." Inuktitut. No. 53, September 1983, pp.8-11.

48. Mayes, Robert G. "Mass Communication and Canada's Eskimos." Polar Record. Vol. 16, No. 104, 1973, p. 683.

49. Inuktitut Roman orthography (two versions) is the preferred writing system of Labrador Inuit and some Inuit in the western Arctic.

50. Roemer, Hanne. Arctic Co-operatives Ltd. Telephone interview, 30 January 1984.

51. For the purposes of the program, the definition of the Canadian North is based on a commonly accepted boundary line - the Hamelin line - which includes the Arctic and the mid-North, i.e., the Yukon, the Northwest Territories, and the northern regions of British Columbia, the Prairie Provinces, Ontario, Quebec, and Labrador. The boundary line follows the northern limits of continuous population distribution, coinciding roughly with the northern reach of conventional (terrestrial) private radio and television networks.

52. For example, one satellite television transponder rents for approximately $1.3 million per year.

53. Canada. Department of Indian Affairs and Northern Development. Indian and Inuit Affairs Program. Indian Conditions, p. 4.

54. Innis, H. The Bias of Communication. Toronto: University of Toronto Press, 1951.

55. Valaskakis. The Inukshuk Anik B Project, 1981, p. 132.

56. Ruggles, R., Anderson, J., Blackmore, D., Lafleur, C., Rothe, J., and Taerum, T. Learning at a Distance and the New Technology. Vancouver: Educational Research Institute of British Columbia, 1982.

57. Unpublished address by John Amagoalik to the Annual Assembly of the Inuit Tapirisat of Canada, 1980.

58. Unpublished paper presented by the Inuit Tapirisat of Canada at the Inuit Circumpolar Conference, Point Barrow, Alaska, 1977.

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MAP OF CANADA, showing physical dimensions, provincial and territorial divisions and major cities.

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END

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